

# Playground Surfacing Materials

## Introduction

Nearly 80% of all playground injuries result from children falling to the ground from playground equipment. Insufficient or improper protective surfacing material beneath the equipment increases the severity of these playground injuries.

The Centers for Disease Control and Prevention (CDC) reports an average of 200,000 children, aged 14 years and younger, require treatment in an emergency room for playground-related injuries each year, with severe fractures, internal injuries, concussions, dislocations and amputations accounting for over half of these injuries and some deaths reported.

Because falling from playground equipment can result in a life-threatening injury to the head or body, it is crucial to have adequate protective surfacing beneath and surrounding playground equipment. Even with a cushioned surface, broken bones, dislocations and other injuries may still occur, but the risk of more serious trauma is less severe.

It's important to note that not all playground equipment carries the same risks for fall-related injuries. For instance, equipment where a child's feet remain in contact with the ground (playhouses, sand boxes and similar activities) will usually not require protective surfacing.

For other equipment, however, safety dictates that the proper surfacing be used to protect children. This article will discuss the types of surfacing material available for use in playgrounds, along with the advantages and disadvantages of each.



### What CAU Recommends

- > Hire a Certified Playground Safety Inspector (CPSI) to inspect association playgrounds
- > Eliminate hard surfaces beneath playgrounds
- > Provide adequate protective surfacing beneath and around all playground equipment
- > Maintain protective surfacing at all times
- > Purchase commercial grade play equipment carrying the International Play Equipment Manufacturers Association (IPEMA) certification

### Need More Information?

Additional information on playground surfacing materials is available from the CPSC ([www.cpsc.gov](http://www.cpsc.gov)), the National Recreation and Park Association (<http://www.nrpa.org>) and the National Program for Playground Safety (<http://www.playgroundsafety.org>). Associations may also request additional information on this topic by contacting CAU's Loss Control Department.

## Types of Surfacing Material

Installing a playground directly over a hard surface, such as concrete or asphalt, is not safe because these materials will not cushion a fall. Grass and dirt are also unacceptable because wear and environmental factors will cause compaction and loss of shock-absorbing effectiveness. That leaves loose fill and unitary materials as the two options available for safer protective surfaces.

Loose fill materials include: playground mulch, shredded rubber, sand, pea gravel, wood chips, and wood mulch not treated with the chemical preservative chromated copper arsenate (CCA). Since these materials will compact about 25% after application, an initial installation of 12 inches will usually meet the minimum compressed depth requirement. In addition to the depth requirements, loose fill materials require a barrier to contain them within the play area, and adequate drainage beneath the material to prevent standing water from forming.

Unitary materials are manufactured protective surfaces such as rubber tiles, mats, or a combination of energy absorbing materials held in place by a binder. These materials do not compress, and some are suitable for installation over a hard surface. They are available in a variety of colors and styles but remember that darker colors, when exposed to direct sunlight, will retain heat and can result in burns. Check to see if lighter colored materials are available where direct sunlight heating is a possibility.

When choosing a playground surface, associations will need to review the advantages and disadvantages of the various surfacing materials and select the one most appropriate for their playground site. Below, you'll find some quick considerations to help you get started.

## Loose Fill Materials

Loose fill materials are a popular choice in many playgrounds because the materials are readily available in most areas. Other advantages of loose fill materials include their low initial cost, ease of installation, and low susceptibility to vandalism.

Associations that choose to protect their playground's loose fill surfacing materials will need to perform regular maintenance and upkeep of the playground surface to ensure proper cushioning is provided, as continued use can displace the cushioning material beneath swings and other equipment, and weather can cause the material

to move beyond the containment area of the playground. Other disadvantages of loose fill material are that it's easy for children to swallow, doesn't provide sufficient cushioning over hard surfaces, and can conceal things like animal waste and trash.

## Unitary Materials

Unitary materials are gaining popularity in many playgrounds. These surfaces can be installed directly over a hard underlying surface and provide good accessibility. These materials also bring the benefits of low maintenance, consistent shock absorbency, good footing and resiliency (they aren't easily moved or displaced during use).

Associations that choose to protect their playgrounds with unitary surfacing materials will need to pay a higher initial installation cost, but this will be recouped over time because of the lower maintenance costs. Other drawbacks of unitary surfacing materials are that underlying surfaces must be level, the materials can be flammable, unitary surfaces may be subject to vandalism, and the surfaces can curl and create tripping hazards.

## Critical Height

Critical height is a term used to describe the shock-absorbing performance of surfacing materials. For example, material with a critical height value of 10 feet should be capable of preventing a life-threatening head injury for a fall from 10 feet high or lower.

The surfacing material used under and around a particular piece of playground equipment should have a critical height value of at least the height of the highest accessible part of the equipment. Since children climb on and over equipment, the highest point may be the top of a guardrail or the roof of an elevated structure, and not necessarily on the highest point intended for play.

Loose fill materials should never have a compressed depth less than 9 inches, so frequent replenishment is required. Also, if the ground freezes during winter, loose fill materials will have a lower critical height value.

You can find the critical height values for various loose fill materials on the CPSC website, [www.cpsc.gov](http://www.cpsc.gov). For unitary materials, the association should request test data from the manufacturer that will specify the critical height of the material.